

growth carries the stamens upward. In the bud the style is uniformly longer than the stamens, but later on it may be equal to or shorter.

The pollen of this species is large and spherical, 47–50 μ , with several prominent pores. There was no marked difference found between the grains from stamens of various lengths. There was also no evident difference between the stigma of the pistil with styles of various heights.

The remarkable difference between the pollen of the two *Lithospermums* may have its value in classification. In no other instance have I observed such wide dissimilarities in size, shape and markings within the same genus. As a rule, the pollen of a genus follows the same type with slight variations, except possibly in the matter of size. The differences might be termed generic, and in the proper classification the *L. angustifolium* may well be separated from the genus containing the *L. canescens*—in fact this is done in De Candolle's *Prodromus*, where the *L. angustifolium* is one of the species constituting the genus *Pentalophus*.
—BYRON D. HALSTED, *Rutgers College, New Brunswick, N. J.*

CURRENT LITERATURE.

The genus *Carex*.

No genus is more severely let alone by the average botanist than this huge group of sedges. Our North American species have long been studied by Prof. L. H. Bailey, and his views have been set forth in a series of papers, published mostly in this journal, and in his monograph, which appeared among the *Proc. Amer. Acad.* publications for 1886. We have before us his latest contribution¹ to this subject, after having had the opportunity of seeing all the existing types of our North American species. This has been so thoroughly done, that almost every name which has been applied to N. Am. species is accounted for. This necessitates very many changes, more than one likes to see, but they seem necessary, and presently the new names will be just as familiar as the old. It is impossible to pass an opinion off hand upon a work of this kind, for a critic must have all the facts before him before his opinion is worth anything. It is often injustice to a monographer to pass judgment too hastily upon his work, for his opinions are the result of long and patient study, while a flippant criticism is entirely unembarrassed by facts. Therefore, the best test of such a work as that of Professor Bailey is its wearing power. It would be impossible in this brief notice to mention even the principal changes in nomenclature. In this connection the Torrey Botanical Club should be congratulated upon the appearance of this initial number of its proposed series of memoirs. It is a movement in the right direction, and should be encouraged by the hearty support of American botanists.

¹ BAILEY, L. H.—Studies of the types of various species of the genus *Carex*. *Memoirs of the Torr. Bot. Club*, Vol. I, No. 1. pp. 85. Issued May 25, 1889. Price \$1.00.

Cryptogamic Botany.

Although it is true that "no general handbook to cryptogamic botany has appeared in the English language since the Rev. M. J. Berkeley's, in 1857," as Bennett and Murray remark in the first sentence of the introduction to their new text-book, yet the subject has received good treatment in several general works both by English authors and through translations. A new text-book devoted exclusively to this section of systematic botany must therefore show itself superior to what is already published, in other ways than having a separate binding, in order to be fully acceptable. There is no doubt that the new "Handbook of Cryptogamic Botany" by Bennett & Murray² presents the subject in the main in accordance with the latest views and in convenient compass for the use of students. In attempting to cover the whole ground uniformly, the authors have scarcely escaped the tediousness of a bare enumeration of facts. The facts can be relied upon, however, as judiciously collated directly from authoritative sources.

The subject is subdivided as follows: (1) Vascular Cryptogams, (2) Muscineæ, (3) Characeæ, (4) Algæ, (5) Fungi, (6) Mycetozoa, (7) Proto-phyta, the last including diatoms and bacteria. This is not a classification that a majority of advanced systematists are likely to favor, particularly as to the separation of the algæ and fungi into distinct groups. It is well that the myxomycetes should not masquerade as fungi; but it is difficult to see why the bacteria are not equally entitled to autonomy, instead of being thrust among the protophytes as the only non-chlorophyllous members of that group. If the classification of the thallophytes adopted by the authors is one for convenience, it invites little criticism, but if it is to show relationship, there are as many inconsistencies in it, to say the least, as in that of Sachs, which most later works have adopted.

We can not but think that the authors are unfortunate in their attempts to improve the commonly accepted terminology. Not until botanists make a serious attempt to anglicize such names as geranium, petunia and gladiolus into *gerane*, *petuny* and *gladiol* is it likely that they will adopt *sclerote*, *epiderm* and *antherid* for sclerotium, epidermis and antheridium. But if one is to adopt changes of this kind in order to simplify technical language, why not be consistent and use *prothal* for prothallus and *sore* for sorus? Other considerable changes in accepted usage are the use of the term *sperm* and its combinations for the sexually produced spore, and the restriction of the meaning of reproduction.

Aside from the strictures noted we have only praise for the work. It is an excellent epitome of present knowledge on the subject, with many references to the principal original publications, numerous fine illustrations, and the right kind of paper, typography and binding. Many of the illustrations will be familiar to students of Sachs' and de Bary's works,

²BENNETT, ALFRED W., and MURRAY, GEORGE.—A handbook of cryptogamic botany. pp. 473; 378 illustrations. 8vo. London: Longmans, Green & Co., 1889.

and some would appear to belong to the former which are not so accredited.

Physiology of tannin.³

Concerning no substance found in such quantity in plants has our knowledge remained so long so defective as in regard to tannin. This is largely due presumably to the rare combination of botanical knowledge with the skill of the analytical chemist. Most botanists who have studied it have used microchemical methods, and most chemists who have given it any attention have paid little heed to its functions or origin in the plant. The unsatisfactory state of our knowledge can be discovered by consulting any, even the most recent, of our text-books. After considerable study with microchemical methods, Dr. Kraus, of Halle, undertook a thorough comparative study of the origin and behavior of tannin, using the most approved methods of the quantitative chemist for determining its presence and amount. These were chiefly the Schröder-Löwenthal method of titration with chamæleon, and Fleck's method of precipitation with neutral cupric acetate, ignition, and weighing as CuO. The former method, while not indicating the total amount present, is nevertheless suitable for comparative studies. Kraus's chief conclusions are as follows:

Tannin is formed in green leaves under conditions which coincide closely, though not exactly, with those of assimilation. Tannin is not, however, a product of assimilation of carbon, for this process can and does go on independently. Tannin once formed does not undergo chemical alterations, but is carried out of the leaves along the veins and petiole to places of storage. In woody twigs it descends chiefly or only in the bark. This descent begins with the unfolding of the leaves and continues late in the growing season. The tannin of germinating rhizomes even though a large portion of their weight (25-40 per cent.) disappears to form the new organs, does not diminish in quantity. On the contrary, it may increase. All the new organs contain tannin, which must therefore be formed in the darkness. Neither in woody plants nor in seeds does tannin behave as a reserve stuff.

After discussing the two modes of formation of tannin indicated above, the author gives an account of its anatomical relations, treating (a) of the transitory tannin, the green tissues in which it is formed, the conducting and storage tissues, and (b) of the autochthonous or resting tannin in growing-points, tannin-sacs, etc. The tannin of galls he calls, provisionally, autochthonous. Chapters on the methods of research and a sketch of previous investigations are followed by the details of his experiments, covering 52 pages.

It strikes us that the author is rather inclined to depreciate or ignore the labors of previous investigators, and that his assumption that he

³ KRAUS, GREGOR.—Grundlinien zur Physiologie des Gerbstoffs. pp. vi. 131. 8°. Leipzig: W. Engelmann. 1889. M. 3.

starts *de novo* is rather too sweeping. It is true that conclusions founded on microchemical methods are not so well based as those on quantitative determinations. It is also true that when the conclusions of other investigators coincide with his own, Kraus should cite these with due credit, which he too often fails to do. In this work, however, we have a firm point of departure, and with these well sketched "Grundlinien" it is to be hoped that the additions will be rapid until we can have the work with the title, *Physiologie des Gerbstoffs*.

Minor Notices.

THAT MAGNIFICENT publication, *Die natürlichen Pflanzenfamilien*, has just completed III Teil, 1. Abteilung b, in six parts. It contains *Phytolaccaceæ*, and *Nyctaginaceæ* by A. Heimerl, and *Aizoaceæ*, *Portulacaceæ*, and *Caryophyllaceæ* by F. Pax. The chief changes among North American *Nyctaginaceæ* are that *Oxybaphus* is included under *Mirabilis*, and *Pentacrophys* under *Acleisanthes*. The name *Aizoaceæ* may sound strange, but it stands for our *Ficoideæ*. Our genera of *Portulacaceæ* stand as usual, but in *Caryophyllaceæ* the changes are numerous and radical. In the first place, the *Illebraceæ* are brought back. *Lychnis* seems to disappear from our native flora, our species being divided among *Agrostemma*, *Melandryum*, *Viscaria*, etc. For instance, *Lychnis Githago* Lam. becomes *Agrostemma Githago* L., *L. apetala* L. is *Melandryum apetalum* Fenzl., and *L. alpina* L. is *Viscaria alpina* Fr. What becomes of all of them is hard to find out. *Mœhringia* is restored to generic rank, and another *Arenaria*, *A. physodes* DC., becomes *Merckia physodes* Fisch. *Tissa* Adans. replaces *Lepigonum* or *Spergularia*, as followed by Dr. Britton in *Bulletin of Torr. Club* (May). It will be a task interesting to some of our botanists now to reconstruct our specific names on this new basis.

A REVISION of North American *Rhamnaceæ* has just been published by Dr. Wm. Trelease, being a reprint from the *Trans. St. Louis Acad. Sci.*, Vol. V, No. 3. The order contains 12 North American genera, and the following changes from Watson's *Bibl. Index* are noted: *Scutia* disappears, *S. ferrea* Brogn., becoming *Condalia ferrea* Griseb.; *C. Mexicana* Schl. is added from Arizona; *Reynosia latifolia* Griseb. is added from S. Florida; *Rhamnus Insulus* Kellogg, is included under *R. crocea* Nutt.; *Sageretia Wrightii* Watson is added from New Mexico and Texas; *Columbrina reclinata* Brogn. is added from S. Florida.

VOLUME I., Part 6, of *Pittonia* (March-May, 1889), has an interesting table of contents. This part completes the volume, which is suitably indexed. The amount of botanical work represented by this first volume may be inferred when it is known to contain 6 new genera, 180 new species, and 3 new varieties. This does not include the numerous transferred species. The present part contains the following papers: *Vege-*

tation of the San Benito islands; Supplementary list of Cedros island plants; Concerning some Californian Umbelliferæ; Botanical nomenclature in N. Am.; Baron Mueller on early binomials; New or noteworthy species, iv; Plants from the bay of San Bartolomé; Analogies and affinities, i; New or noteworthy species, v; Reminiscences of Major J. E. LeConte. All these papers are from the pen of Professor Greene, excepting the last, which is by Mary Graham.

ANOTHER CONTRIBUTION to local botany comes to us in the list of the flora of Lorain county, Ohio.⁴ It is a bare list, without notes on distribution, locality or abundance, omissions which are explained by the designation "preliminary." It is well printed, in such a way as to leave space for the notes which will need to be inserted as the data for a complete catalogue are obtained, and is accompanied by an excellent detailed map of the county. The nomenclature conforms to that of the revised Manual which is soon to appear.

NOTES AND NEWS.

TORREYA CALIFORNICA is figured in *Gardener's Chronicle* of June 29.

EDWARD GILLET, Southwick, Mass., desires a large number of the roots of *Dodecatheon Meadia*.

MR. H. H. RUSBY has been appointed Professor of Botany and Materia Medica in the New York College of Pharmacy.

MR. T. S. BRANDEGEE, a well-known western botanist, has been married to Mrs. Mary Curran, the botanical curator of the California Academy of Science.

A BEAUTIFUL mountain meadow on Mount Rainier, covered with *Erigeron salsuginosus* in bloom, is reproduced in *Garden and Forest* (July 3) from a photograph.

REV. THOMAS MORONG, now traveling in the Argentine Republic, has written a short series of articles for *The Standard* of Buenos Ayres, on the Paraguayan flora, chiefly with reference to forage plants.

A HYBRID *Catalpa* is described and figured in *Garden and Forest* (June 26) by Professor Sargent. It is thought to be a hybrid from *C. Kæmpferi*, the Japanese species, and one of the American species, *C. bignonioides* or *C. speciosa*, probably the former.

THE GOLD MEDAL of the Linnæan Society has been awarded this year to Professor Alphonse DeCandolle, in recognition of his important services to botany. The gift was received by his grandson, a fourth representative of a very distinguished line of botanists.

⁴ WRIGHT, ALBERT A.—Preliminary List of the flowering and fern-plants of Lorain county, Ohio. Map. 8°. Oberlin, O.: E. J. Goodrich. 1889.